

**SYSTEM AND METHOD FOR DYNAMIC, MULTIVARIABLE
COMPARISON OF FINANCIAL PRODUCTS**

FIELD OF THE INVENTION

5 The invention relates to the field of electronic commerce, and more particularly to the dynamic, realtime comparison of financial products such as mutual funds.

BACKGROUND OF THE INVENTION

10 The advent of electronic commerce has led to an increasingly sophisticated array of networked financial products and services, and consumer tools to access and analyze those products and services. Online shopping comparators, in which categories of consumer goods or services are sorted by price, are known. Reverse auction services, in which a consumer names a price
15 and then a search engine attempts to match that price amongst participating vendors, are also known. In the realm of financial products and services, a host of Internet-based banking, mutual funds, and other financial tools have been deployed.

 In the case of mutual funds, the subject product involves a set of
20 performance numbers and other quantities which require more than a simple, one-field comparison on the basis of price. As a result, shopping for networked mutual fund products typically involves running a comparison engine in which a consumer wishing to invest in a mutual fund enters a set of predefined ranges

for several variables fitting their needs, and pertaining to funds in the search set. For instance, the consumer may enter a request for comparison of funds whose 5-year average return is at least 20% with an expense load of no more than 1.5%. Conventional search engines will then access some type of database
5 whose fields correspond to these predefined variables, and return only those mutual fund products matching the complete criteria set by the inquirer.

However, those types of comparison engines suffer from more than one drawback. For one, if a candidate mutual fund lacks one of the selected criteria but very satisfactorily meets all of the remainder, conventional search engines
10 will omit that product from the presentation of search results. Moreover, while such engines permit a user to input ranges for different criteria, once they are entered those ranges are not weightable. That is, the user is not afforded the opportunity to create a sliding scale of importance to be applied to the various quantitative factors supported by the search engine, or to sort out results once
15 hits are found based on variable weights. In addition, conventional search engines are not equipped to allow a user to re-search an existing collection of hits by adding, deleting or adjusting one or more criteria or weights on those criteria, to refine searches and focus in on products of particular interest.

Further, conventional search engines may be constrained in the input
20 feeds they use, and not be able to obtain multiple feeds or frequent or realtime updates. More flexible and robust financial search technology is desirable.

SUMMARY OF THE INVENTION

The invention overcoming these and other drawbacks in the art relates to a system and method for dynamic, multivariable comparison of financial products which permits consumers to select, enter, and edit criteria of their choosing, and weight those criteria according to user objectives. Search results based on this multivariable comparison may be presented in a quantitative or hybrid quantitative/graphical form, and links to service sites for purchase of the products involved may be presented. The database or databases from which candidate funds or other products are drawn for comparison by the search engine may be updated frequently or in realtime, and the search criteria may involve more than purely quantitative data. For instance, a user may wish to restrict their search for a financial or other product to subsets within certain categories, such as growth funds within the universe of available mutual funds. The invention in one embodiment is reflected in the Fund Profiler™ product of the assignee of this application.

BRIEF DESCRIPTION OF THE DRAWINGS


 ~~The invention will be described with reference to the accompanying drawings, in which like elements are referenced by like numerals.~~

Fig. 1 illustrates a search engine architecture according to a first illustrative embodiment of the invention.

Figs. 2(a)-2(y) illustrate user interfaces and search logic for illustrative comparisons executed by the invention.

Fig. 3 illustrates a flowchart of comparison processing according to the invention.

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DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The invention will be described with reference to an illustrative architecture shown in Fig. 1, in which a transaction server 106 communicates with a variety of database and other resources to coordinate the delivery of financial comparisons to a consumer at a client 118. Client 118 is connected to the transaction server 106 via communications link 104.

Communications link 104 may be, include or access any one or more of, for instance, the Internet, an intranet, a PAN (Personal Area Network) a LAN (Local Area Network), a WAN (Wide Area Local Network), or a MAN (Metropolitan Area Network), a frame relay connection, an Advanced Intelligent Network (AIN) connection, a synchronous optical connection, DSL (Digital Subscriber Line) connection, a digital T1, T2, or E1 line, Digital Data Service (DDS) connection, DSL (Digital Subscriber Line) connection, an Ethernet connection, an ISDN (Integrated Services Digital Network) line, a dial-up port such as a V.90, V.34, or V.34bis analog modem connection, a cable modem, an ATM (Asynchronous Transfer Mode) connection, or FDDI (Fiber

Distributed Data Networks) or CDDI (Copper Distributed Data Interface) connections.

Communications link 104 may furthermore be, include or access any one or more of a WAP (Wireless Application Protocol) link, a GPRS (General Packet Radio Service) link, a GSM (Global System for Mobile Communication) link, a CDMA (Code Division Multiple Access) or TDMA (Time Division Multiple Access) link such as a cellular phone channel, a GPS (Global Positioning System) link, CDPD (cellular digital packet data), a RIM (Research in Motion, Limited) duplex paging type device, a Bluetooth radio link, or an IEEE 802.11-based radio frequency link. Communications link 104 may yet further be, include or access any one or more of an RS-232 serial connection, an IEEE-1394 (Firewire) connection, an IrDA (infrared) port, a SCSI (Small Computer Serial Interface) connection, a USB (Universal Serial Bus) connection or other wired or wireless, digital or analog interface or connection.

Client 118 itself may be or include, for instance, a personal computer running the Microsoft Windows™ 95, 98, Millenium, NT, or 2000, Unix, Linux, Solaris™, OS/2™, BeOS™, MacOS™, or other operating system or platform. Client 118 may include a microprocessor such as an Intel x86-based device, a Motorola 68K or PowerPC device, a MIPS, Hewlett Packard or Alpha RISC processor, a microcontroller or other general or special purpose device operating under a programmed control. Client 118 may furthermore include electronic memory such as RAM (random access memory), or EPROM

(electronically programmable read only memory), storage such as hard drive, CDROM or rewritable CDROM or other magnetic, optical, or other media, and other associated components connected over an electronic bus, as will be appreciated by persons skilled in the art. Client 118 may also be a network-
5 enabled appliance such as a WebTV™ unit, radio-enable Palm™ Pilot or similar unit, a set-top box, a game playing console such as Sony Playstation™ or Sega Dreamcast™, a browser-equipped cellular telephone, or other TCP/IP client or other device.

The transaction server 106 may be or include, for instance, a
10 workstation running the Microsoft Windows™ NT™, Windows™ 2000, Unix, Linux, IBM AIX, Hewlett-Packard UX, Novell Netware™, Sun Microsystems Solaris™, OS/2™, BeOS™, Mach, Apache, OpenStep™, or other operating system or platform. Transaction server 106 includes or executes a search engine 116 capable of interrogating or querying a relational or other database
15 source to execute user commands. In the illustrative embodiment, the transaction server 106 communicates via communications link 108 to a set of information sources 110a . . . 110n. The information sources 110a . . . 110n may be or include, for instance, commercially available financial or other information sources, such as a feed on a realtime or batch basis from the
20 Lipper™ financial network source. It will be appreciated that other information sources, singly or together, may communicate with transaction server 106 to serve as raw information for customized consumer inquiries.

Search engine 116 is configured to accept information from the sources 110a . . . 110n and interrogate the resulting information feed, in relational database or other format. In one implementation of the invention, the search engine 116 may advantageously be, include or access the commercially available Frictionless™ product available from Frictionless Commerce, Inc. Search engine 116 may also be, include or access other existing data storage or management, technology such as the Oracle™ relational database sold commercially by Oracle Corp. Other databases, such as Informix™, DB2 or other data storage or query formats or platforms, such as SQL may also be used, accessed or incorporated in the invention.

In the operation of the invention, the client 118 may present a consumer wishing to inquire about mutual fund or other products with a user interface 102 laying out a set of user-selectable criteria 120, illustrated as criteria 1 . . . n. As illustrated in more detail in Figures. 2(a)-2(y), the criteria 120 in general may include enumerated financial information such as average fund returns for 1, 5, 10 years or other applicable periods, expense loads, fund asset size, net asset value (NAV) fund type, minimum investment and other qualitative or quantitative categories of information. In addition, the user may be presented with user-definable weighting ranges on interface 102.

That is, in the illustrative embodiment, the invention presents the user via interface 102 with not just sets of quantitative or qualitative fields, but also weighting module 124 to permit a set of a weighting ranges to allow the user to

attach discretionary levels of importance to those various ranges, should they be present in candidate fund. The user may assign a set of weights to those selected data, for instance categorizing different features as "must have" for greatest weighting, or lesser degrees according in one implementation to a sliding, radio-button scale as illustrated in Fig. 2(g). This means that a consumer at client 118 may receive a broad compilation of search results reflecting a collection of complex information, but sorted according to that user's particular needs.

For instance, one user may be looking for mutual fund products having the characteristics of at least a 15% average annualized return over the last five years, while being categorized conservatively as an income fund, and having an expense load of less than 1.5%. For that user and their comparison criteria, mutual fund products having those characteristics may be presented and sorted, while other mutual funds matching the quantitative criteria, but lacking the income fund category, may also be presented for completeness and flexibility. As illustrated in Figures 2(a) - 2(y), the interface 102 of the invention may present the user with graphical result code 122 indicating the varying degree of match between the user's inputted criteria and the characteristics of the funds presented in the search results 112.


Illustratively the interface 102 may present the user with a blue bar next to entries in the search results 112 whose degree of blueness or length of bar reflects how well candidate funds or other products meet all inputted criteria.

The user may, therefore, immediately isolate the products which meet all stated criteria. However, the invention may also present the user with other graphical result codes 122, such as a yellow bar, indicating that some but not all of criteria 120 were met. Nonetheless, a candidate fund marked with a yellow bar
5 may generate a higher match score and receive a higher ordinal ranking if a given mutual fund product does not contain all stated criteria 120 of the search, however matches higher-weighted criteria to a particularly strong degree.

The resulting sort list in the search results 112 may thus present the user with a variety of matching funds, some meeting all criteria 120 while others
10 may have fewer categorical matches but higher net match scores resulting from user-defined weighting. The weighting module 124 may store pre-assigned default values for different categories of the criteria 120, but which the user may manipulate via interface 102 to adjust up or down. The user may similarly manipulate the interface 102 to create or access an investment profile 126 for
15 that user for the purpose of pre-filling one or more different criteria 120, for use during later sessions.

Once the user has entered or selected all criteria 120 at the client 118, the criteria 120 are communicated to the transaction server 106 for entry into the search engine 116. Search engine 116 obtains the criteria 120 for a
20 relational or other query against the information sources 110a . . . 110n on a realtime or batch basis. Once the information sources 110a . . . 110n are interrogated the search engine 116 collects and transmits the search results 112

to the client 118 via communications link 104. The search results 112 may satisfy the user in initial form, providing enough information to permit the user to make a transaction decision. In that regard and as illustrated for instance in Fig. 2(m), 2(x) and 2(y), interface 102 may include a transaction link 128
5 permitting the user to reach a linkable Web or other site via a URL or other linking resource, to enter information, obtain a prospectus, perform a transaction or take other steps.

 However, in the practice of the invention if the user wishes to revise or refine search results 112, provisions made for search refinement through search
10 modification module 114 accessible through the interface 102. The search modification module 114 allows the user to execute editing functions to alter, delete, add, or otherwise manipulate the criteria 120 to re-execute or refine the search.

If the user chooses to revise the criteria 120, they manipulate the
15 interface 102 to enter different values, ranges, or weights for comparison against the information sources 110a . . . 110n. In one embodiment, the search results 112 may be stored locally on the client 118 so that further refinements within the search results 112 themselves may be performed without the need to communicate over communications link 104 and other facilities. Conversely, if
20 the user wishes to add to the criteria 120, or to replace one or more of the criteria 120 with entirely new values, it may be necessary to communicate

between communications link 104 and other resources to obtain new search results 112.

A revised or refined search may produce new search results 112, with recalculated and re-presented graphical results codes 122 indicating a new ordinal ranking of mutual funds or other products, again for instance using blue bars, yellow bars, or other icons or other graphical representations. It may be noted that the transmissions via communications link 104 or otherwise may be encrypted using PGP, SSL, 128-bit encryption or other security techniques.

An illustrative example of a comparison session will be described with reference to Figs. 2(a) and 2(z) in more detail. As shown in Fig. 2(a), the user interface 102 may present the user with a login screen. The user then may be presented with a selection screen as shown in Fig. 2(b) to select the profiling function of the invention. As shown in Figs. 2(c) - 2(e), the user may then be presented with a description of the service along with instructions on how to proceed with invoking a comparison session. The user may then be presented with an option to either select a predefined search profile, illustratively a set of investment objectives rated between very aggressive and very conservative, and a custom profile selection permitting individual criteria selection, as shown in Fig. 2(f).

If the user elects to set up a custom profile, then as shown in Fig. 2(g) the set of criteria 120 may be presented along with the weighting module 124 in the form of selectable radio buttons to arrange their desired complex of criteria.

As shown in Figs. 2(h) and 2(i), the user may drill down into individual ones of the criteria 120 for range selection and explanations of the pertinent data. Once the desired ranges and weights are input or selected for all of the criteria 120, the entire set of search criteria are communicated to the transaction server 106.

5 The search engine 116 then interrogates the information sources 110a . . . 110n, and returns search results 112 illustrated in Figs. 2(j) - 2(l). As shown for instance in Figs. 2(j) - 2(l), the graphical result code 122 for each entry within the search results 112 may be included along with quantitative and other information to permit the user to compare and evaluate different products
10 coinciding with their needs. As shown in Fig. 2(m), a transaction link 128 may be presented, in this case illustratively a request for a financial prospectus.

5-3 > As illustrated in Figs. 2(n) - 2(y), once the transaction server 106 returns the search results 112 to the client 118, the search result 112 the user may drill down through the search results 112 in order to view more information about
15 particular funds, sort the results, alter one or more of the criteria 120 and generally manipulate the user interface 102 to refine and explore the search results. As illustrated in Fig. 2(y), another possibility for the transaction link 128 as a link to a purchase site for individual funds or other products, depending on the search results 112, the user's existing account and other
20 factors.

5-4 > ~~Overall processing of mutual fund comparative profiles according to the invention is illustrated in Figure 3. In step 302, processing begins. In step 304,~~

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a user logs in at client 118, and the login may include authentication processing if desired. In step 306, either criteria 120 to be newly entered or pre-filled criteria if investment profile 126 is activated are presented via on the interface 102. In step 308, the user selects or inputs the criteria 120 they wish to apply to the search, along with any weights via the weighting module 124. In step 310, the user's entered search information is communicated via communications link 104 to the transaction server 106.

In step 312, the search engine 116 communicates with the information sources 110a . . . 110n to interrogate those sources for matches to the user's search criteria 120. In step 314, search results 112 are communicated to the client 118 and presented to the user, which may include for example graphical result code 122, numerical data, ordinal rankings, advertising, or other information. In step 316 a revised search is executed using search modification module 114, if desired. In step 318, linking to a transaction site via a transaction link 128 is executed if the user so desires. In step 320, the search results 112 and other information may be stored on client 118, transaction server 106 or elsewhere if desired. In step 322, processing ends.

The foregoing description of the system and method for dynamic multivariable comparisons according to the invention is illustrated, and variations in configuration and implementation will occur to persons skilled in the art. For example, while search results 112 have been described as being visually presented on interface 112 of client 118, search results and related

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